

Arboviral Infection

Agent(s): In Virginia, the agents of arboviral infection, from most to least common, are the mosquito-borne West Nile virus (WNV), La Crosse encephalitis (LAC) virus, St. Louis encephalitis (SLE) virus and Eastern equine encephalitis (EEE) virus. Other arboviral agents causing illness in Virginians include the imported dengue virus and chikungunya virus, which typically infect travelers to endemic regions of the tropics and subtropics, but have not become established in Virginia. Powassan (POW) virus, which is a tick-borne encephalitis virus, was recently discovered in Virginia.

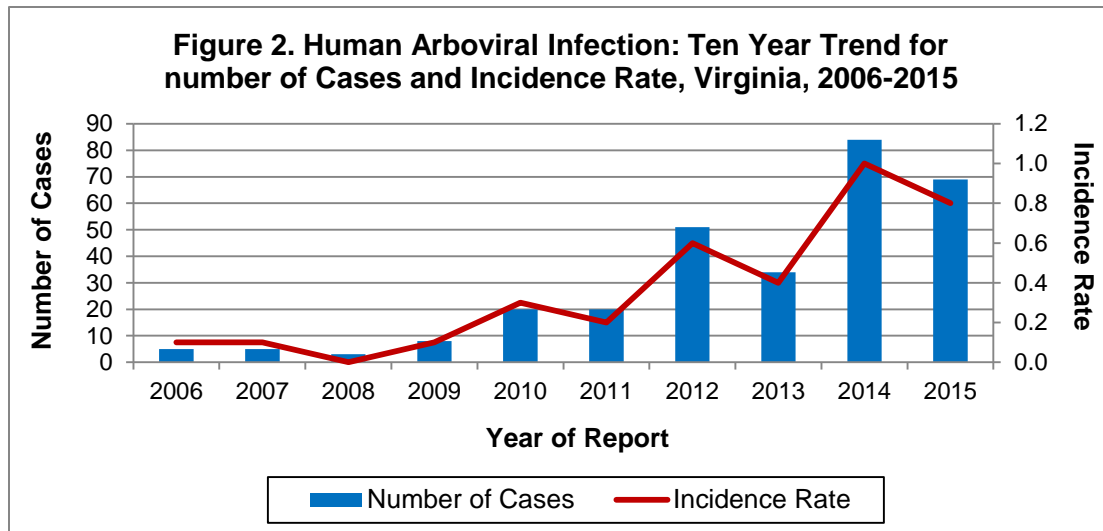
Mode of Transmission: Most commonly through the bite of an infected mosquito. WNV may also be transmitted by blood products via transfusion or transplanted organs from infected donors, and more rarely by cuts or punctures with contaminated scalpels or needles in a laboratory.

Signs/Symptoms: Severity of symptoms differs depending on the particular virus and characteristics of the infected person. Most infections are asymptomatic. Mild cases may appear as fever with headache. More severe disease can cause encephalitis (i.e., inflammation of the brain) or meningitis (i.e., inflammation of the lining of the brain and spinal cord) and may lead to long term or permanent neurological impairment, or death.

Prevention: Minimize bites by avoiding areas infested by mosquitoes or ticks, and, when in those areas, use mosquito or tick repellents and wear long-sleeved, light-colored clothing with pants legs tucked into socks. Additional mosquito control measures include maintaining screens on all open windows and doors and eliminating or regularly dumping all containers that could hold water and breed mosquitoes, including buckets, birdbaths and discarded tires. After visiting tick habitats, a person should thoroughly check all body surfaces for ticks and, if found, carefully remove attached ticks as soon as possible.

Other Important Information: WNV and SLE infections are more likely to cause severe disease in persons over the age of 50, but the majority of infections are asymptomatic. LAC is seen primarily in individuals less than 16 years of age. EEE has a high fatality rate and is more likely to affect children under the age of 15 and adults over the age of 50. The dengue viruses may cause fever, headache, body pain and a rash as well as mild or severe hemorrhagic symptoms in some patients. The chikungunya virus causes fever, headache, rashes, and severe, debilitating joint pain/arthritis in joints of the extremities (hands, arms, feet and legs). Dengue or chikungunya may affect persons of all ages. The dengue and chikungunya viruses are found primarily in the tropical regions of the world, and travelers to those regions may become infected and return to Virginia carrying one of these viruses. Asian tiger mosquitoes in Virginia are capable of being infected with these viruses if they bite infected travelers, and may potentially transmit these viruses locally.

Arboviral Infection: 2015 Data Summary	
Number of Cases:	69
5-Year Average Number of Cases:	41.8
% Change from 5-Year Average:	+65%
Incidence Rate per 100,000:	0.8



Human

In 2015, 69 cases of arboviral infection were reported in Virginia, which is higher than the 5-year average of 41.8 cases per year, but less than the 84 cases reported in 2014 (Figure 2). The majority of arboviral infections (70%) were determined to have been acquired through travel to another country. Specifically, the 24 cases each of chikungunya and dengue were determined to have been acquired in other countries. Of the 21 locally-acquired arboviral infections reported, all were West Nile virus cases. No cases of La Cross encephalitis virus, St. Louis encephalitis, Eastern equine encephalitis or Powassan virus were reported in 2015.

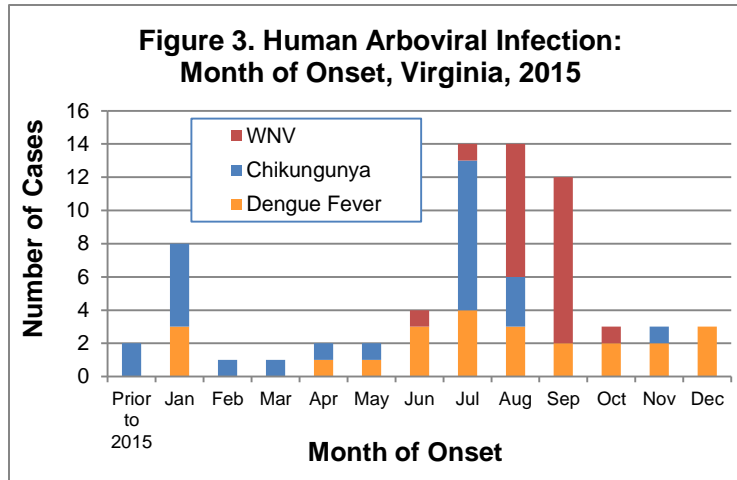
The lower number of reported arboviral cases in 2015 compared to 2014 was attributed to a decrease in the number of imported chikungunya infections, from 58 in 2014 to 24 in 2015. Chikungunya cases were reported across all age groups except infants, with the highest number of cases (n=6) reported among persons 40-49 years of age. Nineteen cases were reported in females and five cases were reported in males. One chikungunya case occurred in a person who traveled to the Caribbean and the remaining cases were associated with travel to Central and South America. Chikungunya cases associated with travel to the American tropics resulted from the introduction and spread of the chikungunya virus into the tropical Americas beginning in 2013.

All 24 dengue cases occurred among people who traveled to dengue endemic countries of South America, Hispaniola, Mexico, or south Asia. The age range of cases was 12 to 75 years. Eleven of 24 dengue cases were among females. There were no reported cases of dengue hemorrhagic fever in 2015.

The number of WNV cases increased dramatically in 2015. Twenty-one cases were reported in 2015 compared to seven cases in 2014. The age range of cases was 36 to 91 years of age. Cases occurred in four regions of the state, sixteen in the northern region, three in the eastern region, and one case each in the central and southwest regions. Two fatalities were attributed to WNV in 2015.

Arboviral infection cases occurred throughout the year, but locally-acquired arboviral infection (WNV) occurred only from June through October (Figure 3). Cases of imported dengue were reported nearly year round, except February and March, while cases of imported chikungunya were reported in every month except June, October and December. As these infections were acquired

out of the country, any seasonality would be based on travel patterns and seasonality of the illness in the endemic countries of origin.



Animal

Zoonotic surveillance for WNV is conducted each year by a limited number of jurisdictions in northern Virginia, the Richmond metropolitan area, and Hampton Roads. These surveillance programs test for the presence of arboviruses in mosquitoes and sentinel chickens. Zoonotic surveillance for EEE is done only by jurisdictions in the Hampton Roads region. Sentinel chicken flocks are maintained only by surveillance programs in the Hampton Roads area. Veterinary records are also obtained from around the state from the Virginia Department of Agriculture and Consumer Services (VDACS) Veterinary Program which surveys for cases of arboviral infection in equines and other animals statewide. No mosquito or zoonotic surveillance and testing programs are in place for LAC or SLE viruses.

In 2015, 417,422 mosquitoes were tested for WNV and 185,832 were tested for EEE. All mosquitoes were tested as “pools” (i.e., batches of approximately 50 mosquitoes). Of the 13,093 pools tested for WNV, 894 (7%) were positive, and of the 5,725 pools tested for EEE, 53 (1%) were positive. Among the positive pools, each was likely to have only contained one infected mosquito. Of the 894 WNV positive pools, 821 were collected in northern Virginia, 55 were collected in eastern Virginia, and 18 in central Virginia. All of the EEE positive pools were collected in eastern Virginia.

In 2015, three EEE-infected horses were reported in the eastern region and one WNV-infected horse was reported in the northern region. Testing of sentinel chickens revealed 21 WNV-positive chickens in the Chesapeake, Norfolk, Suffolk, and Virginia Beach area, and 19 EEE-positive chickens in the Chesapeake, Norfolk, Suffolk, and Virginia Beach area.